

## **STRUCTURAL IMPROVEMENT FOR ALERT SYSTEM**

### **BACKGROUND OF THE INVENTION**

#### **5 1.Field of the Invention**

The present invention relates to an alert system with a sensor to detect metal or magnetic material and then sends the detected result to the micro-processor or the control panel to make comparison between the detected result and database. When any dangerous metal or magnetic material touching 10 against the sensor, the micro-processor sends out a signal to the control panel, prompting the warning system to warn the user with signals or sounds. Meanwhile, the control panel also starts up the protection device to protect the user from being hurt by dangerous metal or magnetic material.

#### **2.DESCRIPTION OF THE PRIORT ART**

15 Today's medical operation still uses traditional operating tools; however, the operating knife is too sharp and the gloves too thin that make doctors fail to find any fracture or damage in the tools. Therefore, the doctors might touch the patients' blood directly because of a single hole pierced by the metal, leading to bacterial infection or disease infection and thus threatening the doctors' and the 20 nursing staff's life.

Furthermore, cleaners cleaning up the garbage may not know the existence of dangerous stuff that might hurt people, such as needle head, sharp metal or magnetic material.

In view of such disadvantages, the inventor of the present invention was 25 devoted to finding a solution and accomplished structural improvement for alert system.

### **SUMMARY OF THE INVENTION**

The main objective for the present invention is to provide an alert system 30 with a sensor called CCD able to detect metal or magnetic material and sends the detected result to the micro-processor, where the detected result is compared with the data in the database. If the detected result indicates the existence of metal or magnetic material, the micro-processor then sends out a signal to the control panel,

where the warning device warns the user with sounds or signals and the protection device protects the user from being hurt.

Another objective for the present invention is to provide an alert system whose sensor can be a magnetic wave sensor that uses magnetic wave to detect 5 metal or magnetic material and then sends out signals to the control panel. The control panel that detects the existence of metal or magnetic material sends out a signal to the warning device which warns the user with sounds or signals and protects the user from being hurt by dangerous metal or magnetic material.

Still another objective for the present invention is to provide an alert system 10 whose sensor can be a thermal sensor or CCD that utilizes a thermal sensing device to detect the temperature and sends the detected results to the micro-processor. This micro-processor that receives the information from the thermal sensor and the CCD image device compares the result with the database to judge the existence of metal or magnetic material. If any metal or magnetic 15 material is detected, the micro-processor sends out a signal to the control panel, where the warning device warns the user with sounds or signals and the protection device protects the user from being hurt.

One another objective for the present invention is to provide an alert system whose sensor can be made of conductive material. When any metal or magnetic 20 material touches against the conductive material, the sensor sends out a signal to the control panel where the warning device warns the user with sounds or signals. The protection device can be an airtight chamber or contains identifiable or medicinal liquid.

Still one another objective for the present invention is to provide an alert 25 system whose sensor can be a thermal sensor or CCD that utilizes a thermal sensing device to detect the temperature of the metal and magnetic material. The detected results and the image information obtained by the CCD image device are converted into signals which are then delivered to the micro-processor. The micro-processor compares the information with the database to judge the 30 existence of metal or magnetic material. The micro-processor that detects any metal or magnetic material sends out a signal to the warning device and the motor, where the warning device warns the user with sounds or signals and the motor enables the protection device to protect the user.

One more objective for the present invention is to provide an alert system whose sensor can be a diode or beeper. When the micro-processor sends out a signal to the warning device, the diode or beeper of the warning device warns the user against the metal or magnetic material nearby by glittering or beeping.

5 Also another objective for the present invention is to provide an alert system whose sensor can be an airtight chamber. When the micro-processor sends out a signal to the motor, the motor starts automatically and with air injected to the airtight chamber of the protection device which then inflates to protect the user from being hurt by metal or magnetic material.

10 The last objective for the present invention is to provide an alert system whose sensor contains identifiable liquid or medicinal liquid. When the micro-processor sends out a signal to the motor, the motor starts automatically and pressurizes the protection device to push the liquid out, thus warns the user against the metal or magnetic material.

15 The present invention relates to an alert system with a sensor designed to detect metal or magnetic material and then sends the detected result to the micro-processor to make comparison between the result and the database. When the sensor detects metal or magnetic material, the micro-processor sends out a signal to the control panel, prompting the warning system to warn the user with  
20 sounds or signals. The motor receiving the signal from the micro-processor enables the protection device to protect the user from being hurt by dangerous metal or magnetic material. The sensor can be a CCD image device, a thermal sensor, a conductive sensor or an electromagnetic wave sensor that sends out a signal to the micro-processor. The warning device can be a diode or a beeper  
25 that warns the user against metal or magnetic material by glittering or beeping after receiving the signal from the micro-processor. The protection device can be an airtight chamber or contains identifiable or medicinal liquid. The motor that receives the signal from the micro-processor pressurizes the protection device to push the liquid within, thus warns the user against the metal or magnetic  
30 material.

## **BRIEF DESCRIPTION OF THE DRAWINGS**

The drawings disclose an illustrative embodiment of the present invention which serves to exemplify the various advantages and objects hereof, and are as follows:

5 In the following, the embodiment illustrated is used to describe the detailed structural characteristics and operation action for the present invention.

Fig. 1 is an illustration for the first type of structure for the present invention

Fig. 2 is an illustration for the second type of structure for the present invention

10 Fig. 3 is an illustration for the third type of structure for the present invention

Fig. 4 is an illustration for the first type of application for the present invention

15 Fig. 5 is an illustration for the second type of application for the present invention

Fig. 6 is an illustration for the first type of application for the present invention, wherein the sensor is an electromagnetic wave sensor.

Fig. 7 is an illustration for the second type of application for the present invention, wherein the sensor is an electromagnetic wave sensor.

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## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Please refer to Fig. 1. The present invention contains:

25 a sensor 1 that sends out a signal to the control panel 3. The sensor can be made of conductive material 11, a CCD image device 14, an electromagnetic wave sensor 12, a pressure sensor 13 or a thermal sensor 15;

a control panel 3 that consists of an electronic circuit 31, a warning device 32 and a protection device 33. The control panel receives the signal from the sensor 1 to warn the user;

30 when metal or magnetic material 8 touches against the conductive material 11 of the sensor 1, putting through the electronic circuit 31 of the control panel 3, the warning device 32 is prompted to warns the user with sounds or signals. Meanwhile, the protection device 33 of the control panel 3 protects the user from

being hurt by the metal or magnetic material. The protection device 33 could be an airtight chamber 331 (such as gas with certain smell or color) or combined with a motor 332 for pressurization. With the protection device 33 is filled with certain liquid 333 (such as colored liquid, colloid liquid) or medicinal liquid 334

5 the electronic circuit 31 of control panel 3 being put through starts the motor 332, pushing the liquid 333 or the medicinal liquid 334 out of the protection device 33, enabling the user to identify the liquid, and thus protect the user from being hurt. The medicinal liquid 334 could provide disinfection function when the user is wounded. The warning device 32 of the control panel 3 could be a diode 321 or

10 a beeper 322.

In the case where the sensor 1 is a pressure sensor 13, any metal or magnetic material 8 that touches against the pressure sensor 13 would cause unusual pressure. Therefore, the sensor 1 sends out a signal to the electronic circuit 31 of the control panel 3 and prompts the warning device 32 to warn the user with

15 sounds or signals. The protection device 33 of the control panel 3 consists of an airtight chamber 331 and a motor 332. When the control panel 3 receives the signal from the sensor 1, its electronic circuit 31 starts the motor 332 of the protection device, injecting air into the airtight chamber 331 and protects the user from being hurt by the metal or magnetic material. The gas inside the airtight

20 chamber 331 of the protection device 33 can be replaced with identifiable liquid 333 (such as color liquid or colloid liquid) or medicinal liquid 334. When the electronic circuit 31 of the control panel 3 is put through which starts the motor 323 of the protection device 33, the identifiable liquid 333 and the medicinal liquid 334 would flush out from the protection device 33, warning the user against

25 any dangerous material. The medicinal liquid 334 could provide disinfection function for the user being wounded. The warning device 32 of the control panel 3 could be a diode 321 or a beeper 322.

Please refer to Fig. 2. The present invention contains:

a sensor 1 that sends out a signal to the micro-processor 2. The sensor can

30 be made of conductive material 11, an electromagnetic wave sensor 12, a pressure sensor 13 or a CCD image device 14;

a micro-processor 2 that receives the signal from the sensor 1, compares the results with the database of the micro-processor 2 to judge the existence of

metal or the magnetic material 8 and thereafter sends out a signal to the control panel 3.

a control panel 3 that consists of an electronic circuit 31, a warning device 32 and a protection device 33. The control panel receives the signal from the sensor 5 1 to warn the user.

The present invention uses a sensor 1 to detect metal or magnetic material 8 and then sends the detected results to the micro-processor 2 where the results are compared with the database's information to determine whether the detected objects are metal or magnetic material. When detecting any metal or magnetic 10 material, the micro-processor 2 sends out a signal to the control panel 3 where the warning device 31 issues a signal or sounds to warn the user and the protection device 32 of the control panel 3 protects the user from being hurt by metal or magnetic material 8. The sensor 1 could be a CCD image device that delivers the information obtained to the micro-processor 2 where a comparison between 15 the result and the database is made. If the comparison result indicates the existence of metal or magnetic material, the micro-processor 2 then sends out a signal to the control panel 3 where the warning device 31 issues sounds and signals to warn the user. The warning device 31 might be a diode 321 or a beeper 322. The electronic circuit 31 of the control panel 3 forces the motor 332 20 of the protection device 33 to inject gas into the airtight chamber 331 (such as gas with certain smell or color) to protect the user. The gas can be replaced with identifiable liquid 333 (such as colored liquid or colloid liquid) or medicinal liquid 334. The electronic circuit 31 of the control panel 3 being put through drives the motor 332 and forces the identifiable liquid 333 or the medicinal liquid 25 334 out of the protection device 33, so as to warn and protect the user with the identifiable liquid. The medicinal liquid 334 could provide disinfection function for the user being wounded.

The sensor 1 can contain both a thermal sensor 15 and a CCD image device 14. The temperature information obtained by the thermal sensor and the image 30 information obtained by the CCD image device is sent to the micro-processor 2 where a comparison between the result and the database is made to see if any metal or magnetic material exists. When detecting any metal or magnetic material, the micro-processor 2 sends out a signal to the control panel where the

warning device 32 warns the user with sounds or signals. The warning device 32 might be a diode 321 or a beeper 322. The electronic circuit 31 of the control panel 3 being put through drives the motor 332 of the protection device 33 to inject gas into the airtight chamber 331 (such as gas with certain smell or color) so 5 as to protect the user. The gas can be replaced with identifiable liquid 333 (such as colored liquid or colloid liquid) or medicinal liquid 334. When the electronic circuit 31 of control panel 3 is put through, driving the motor 332 and forcing the identifiable liquid 333 or the medicinal liquid 334 out of the protection device 33, the user identifying the liquid would be warned and thus protected. The 10 medicinal liquid 334 could provide disinfection function for the user being wounded.

Please refer to Fig. 3. The present invention contains:

15 a sensor 1 that sends out a signal to the control panel 3. The sensor 1 can be made of conductive material 11, an electromagnetic wave sensor 12, a pressure sensor 13 or a CCD image device 14

a control panel 3 that receives the signal from the sensor 1 to warn the user, consisting of an electronic circuit 31, a warning device 32 and a protection device 33.

20 metal or magnetic material 8 combined with non-metal material for the convenience of the sensor's 1 detection. The non-metal material could be cotton 5, swab 6 or suture 7.

25 an electromagnetic wave-proof device 4 used to isolate the detection of the sensor 1. The present invention uses a sensor to detect metal or magnetic material 8 and then delivers the detected result to the control panel 3 where the electronic circuit 31 being put through starts the warning device 32 of the control panel 3 that receives the signal to warn the user with signals or sounds. Metal or magnetic material 8 is placed inside the electromagnetic wave-proof device 4 to isolate the detection of the sensor 1.

30 The sensor 1 might be an electromagnetic wave device 12 that delivers the detected result to the control panel 3 when detecting any metal or magnetic material. The electronic circuit 31 being put through prompts the warning device 32 of the control panel 3 to warn the user with signals or sounds. Metal or magnetic material 8 is placed inside the electromagnetic wave-proof device 4 to

isolate the detection of the sensor 1. The electromagnetic wave-proof device 4 could be an isolation tub 41, a needle head cover or an operating knife protective sheath 42 capable of isolating the detection of the sensor 1.

Please refer to Fig. 4. The sensor of the present invention is installed on a pair 5 of multi-layer operating gloves with one layer connected to the protection device 33 of the control panel 3. The sensor is made of conductive material 11 that puts through the electronic circuit 31 of the control panel when touching against any metal or magnetic material 8. The electronic circuit 31 being put through starts the warning device 32 of the control panel to warn the user with sounds or signals.

10 The protection device 33 can be an airtight chamber 331 (such as gas with certain smell or color) or combined with a motor 332 for pressurization. The protection device 33 is filled with identifiable liquid 333 (such as colored liquid, colloid liquid) or medicinal liquid 334. The electronic circuit 31 of control panel 3 being put through drives the motor 332 that pressurizes the identifiable liquid 333

15 or the medicinal liquid 334 out of the protection device 33, keeping the user alerted with the liquid. The medicinal liquid 334 could provide disinfection function for the user being wounded. The warning device 32 of the control panel 3 could be a diode 321 or a beeper 322.

Please refer to Fig. 5. The sensor 1 contains both a thermal sensor 15 and 20 CCD image device 14. The image information obtained by the CCD image device 14 and the temperature information detected by the thermal sensor 15 is delivered to the micro-processor 2 where the temperature information and image data is compared with the information in the database to judge the existence of metal or magnetic material 8 around. If the comparison result proves the 25 existence of metal or magnetic material, a signal is delivered to the control panel 3 where the warning device 32 warns the user by sounds or signals.

Please refer to Fig. 6 and Fig. 6A. The sensor 1 contains an 30 electromagnetic wave sensor 12 to detect metal or magnetic material 8. The sensor combines metal or magnetic material with non-metal material so as to detect both materials. The electromagnetic wave sensor 12 detecting metal or magnetic material 8 sends out a signal to the control panel 3 where the warning device 32 warns the user with signals or sounds. Metal or magnetic material is placed in an electromagnetic wave-proof device 4 designed to isolate the detection

of the sensor 1. The combination of metal or magnetic material and non-metal material makes the detection of the electromagnetic wave sensor 12 even more convenient. The non-metal material could be cotton 5, swab 6 or suture 7.

Please refer to Fig. 7. Upon the completion of the surgery, the sensor 1 with an electromagnetic wave sensor 12 can detect metal or magnetic material 8. With the combination of metal/magnetic material 8 and non-metal material, the sensor 1 is capable of detecting both kinds of material. The sensor 1 that detects metal or magnetic material sends out a signal to the control panel 3 to indicate the existence of metal or magnetic material 8. The electronic circuit 31 of the control panel 3 that receives the signal forces the warning device 32 to warn the doctor with signal or sounds that there is metal or magnetic material 8 inside the patient's body, thus prevents the patient's wound from inflammation and infection. The non-metal material could be cotton 5, swab 6 or suture 7.

The sensor 1 could be equipped with a capacitance sensor that shows capacitance values depending on the sharpness or distance of the metal or magnetic material when detecting metal or magnetic material. When the capacitance value exceeds the standard, the sensor 1 sends out a signal to the electronic circuit 31 of the control panel 3, prompting the warning device 32 to warn the user with sounds or signals. The protection device 33 of the control panel 3 consists of an airtight chamber 331 and a motor 332. When the control panel 3 receives the signal from the sensor 1, the electronic circuit 31 being put through starts the motor 332 of the protection device, injecting air into the airtight chamber 331 to protects the user from being hurt by the metal or magnetic material. The gas inside the airtight chamber 331 of the protection device 33 can be replaced with identifiable liquid 333 (such as color liquid or colloid liquid) or medicinal liquid 334. The electronic circuit 31 of the control panel 3 being put through drives the motor 323 of the protection device 33 and pushes the identifiable liquid 333 and the medicinal liquid 334 out of the protection device 33, warning the user against dangerous material. The medicinal liquid 334 could provide disinfection function for the user being wounded. The warning device 32 of the control panel 3 could be a diode 321 or a beeper.

The present invention is to provide an alert system with the following functions:

1. The present invention uses a sensor to detect metal or magnetic material, wherein the sensor could be an electromagnetic wave sensor, a thermal sensor, an infrared sensor, a CCD image device or conductive material. The sensor sends the detected result to the micro-processor where the type of the material is judged.
- 5 When metal or magnetic material is detected, the micro-processor sends a signal to the control panel where the warning device warns the user with sounds and signals and the protection device is started to protect the user from being hurt.
- 10 2. The micro-processor of the present invention that receives the signal from the sensor determines the existence of metal or magnetic material. When metal or magnetic material is detected, the micro-processor sends out a signal to the warning device and the protection device to protect the user. The micro-processor receives several signals from the sensor, compares the signals with the database to judge the existence of metal or magnetic material and sends out a signal to the warning device and the motor.
- 15 3. The metal or magnetic material of the present invention can combine with non-metal material, allowing the sensor to detect dangerous metal or magnetic material.
- 20 4. The protection device of the present invention can contain an airtight chamber filled with liquid or medicinal liquid and a motor designed to inject air into the chamber or pressurize liquid out of the chamber to warn the user.
- 25 5. The sensor of the present invention can be equipped with a capacitance sensor that shows capacitance values depending on the sharpness or distance of the metal or magnetic material when any metal or magnetic material exists, so as to detect the location of the metal or magnetic material.

Many changes and modifications in the above described embodiment of the invention can, of course, be carried out without departing from the scope thereof. Accordingly, to promote the progress in science and the useful arts, the invention is disclosed and is intended to be limited only by the scope of the appended claims.